

WHAT IS CLAIMED IS:

1. A self-control traveling system for an expressway, comprising:
  - a plurality of road signs consecutively installed at left and right sides of the expressway;
  - an imaging device configured to generate images of the road signs arranged along the expressway,
  - image processing means for analyzing at least one image inputted from said imaging device, discriminating said road signs and reading sign contents contained in said road signs;
  - storage means for storing map information of the expressway;
  - determination means for determining a current position and a road state on the basis of the map information stored in said storage means and the sign contents read by said image processing means; and
  - control means for controlling steering operation, speed decrement/increment operation and others associated with the self-control traveling operation according to a result of the determination.
2. The self-control traveling system as set forth in claim 1, wherein said road signs comprise graphic forms configured by combinations of specified signs simply indicating current road states capable of being easily analyzed by said image processing means.
3. The self-control traveling system as set forth in claim 1, wherein said road signs comprise starting, end and turning-point information associated with the expressway.
4. The self-control traveling system as set forth in claim 1, wherein said road signs comprise information associated with a curvature, speed limit, number of lanes at a current position in the expressway and others.
5. The self-control traveling system as set forth in claim 1, wherein said imaging device is mounted on a rear-view mirror.
6. The self-control traveling system as set forth in claim 1, wherein said imaging device is a charge coupled device (CCD) camera.
7. A method for controlling a self-control traveling system for an expressway, comprising:

- (a) determining whether at least one image received from an imaging device contains information indicating a starting point for enabling a self-control traveling operation;
- (b) determining whether a self-control traveling command is inputted according to a result of the determination at the step (a), switching a driving mode from a manual driving mode to an automatic driving mode, requesting that destination information be inputted, and starting the self-control traveling operation;
- (c) searching for corresponding map information associated with the inputted destination information when the self-control traveling operation is started, determining whether a turning point is indicated in the searched map information, and performing the self-control traveling operation according to a result of the determination;
- (d) determining whether turning-point information is inputted among input image information during the self-control traveling operation;
- (e) controlling an automatic turning operation or determining whether an automobile has arrived at an end point according to a result of the determination at the step (d); and
- (f) switching the driving mode from the automatic driving mode to the manual driving mode according to a result of the determination at the step (e), and terminating the self-control traveling operation.

8. The method as set forth in claim 7, wherein step (b) comprises:
- (b-1) notifying a driver that the self-control traveling operation can be started;
- (b-2) determining whether the self-control traveling command is inputted in response to the notification at the step (b-1); and
- (b-3) switching the driving mode from the manual driving mode to the automatic driving mode if the self-control traveling command is inputted as a result of the determination at step (b-2), requesting that the destination information be inputted, and starting the self-control traveling operation.
- 25 9. The method as set forth in claim 7, wherein step (c) comprises:
- (c-1) searching for the map information if the destination information is inputted by the driver, and determining whether the turning point is indicated in the searched map information;
- (c-2) proceeding to step (d) while performing the self-control traveling operation on the basis

of the input image information if the turning point is indicated in the searched map information as a result of the determination at step (c-1); and

(c-3) proceeding to step (e) while performing the self-control traveling operation on the basis of the input image information if no turning point is indicated in the searched map information as the 5 result of the determination at step (c-1).

10. The method as set forth in claim 7, wherein step (e) comprises:

(e-1) changing a traveling route to the turning point when the automobile arrives at the turning point;

(e-2) notifying the driver that a section of the self-control traveling operation will end soon 10 when the automobile gets near to the destination during searching for the map information after step (e-1) is completed; and

(e-3) determining whether a sign image indicating the end point is contained in the input image information after step (e-2) is completely performed.

11. The method as set forth in claim 7, wherein step (f) is carried out by switching the driving mode from the manual driving mode to the automatic driving mode when the automobile arrives at a tollgate located at the end point and the automobile is stopped.

12. A self-control traveling system for a roadway including a plurality of road signs installed along sides of the roadway, the system comprising:

an imaging device configured to generate images of the road signs;

20 an image processor programmed to analyze images received from said imaging device, said analysis including discriminating and reading road sign content;

a memory configured as a database of roadway map information;

25 a status processor programmed to determine current position and road state based on roadway map information received from said memory and road sign analysis received from said image processor, and

a control processor programmed to effect vehicle self-control based on said current position

and road state received from the status processor.

13. The system of claim 12, wherein said image processor, status processor and control processor comprise modules of a common processing means.

14. The system of claim 12, further comprising a steering controller, a throttle controller, a brake controller and a transmission controller, wherein said controllers each communicate with said control processor to effect said vehicle self-control.  
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15. The system of claim 14, wherein said vehicle self-control comprises at least control of steering and speed by said control processor through at least said steering controller and throttle controller.

10 16. The system of claim 12, wherein said imaging device comprises a charge coupled device camera.